PATENT ABSTRACTS OF JAPAN

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(71)Applicant : **KYOCERA CORP**

(72)Inventor : **MORISHITA KATSUJI**

(54) RADIO EQUIPMENT

(57)Abstract:

PURPOSE: To easily miniaturize radio equipment which transmits a weak power by arranging a conductor so as to form Sperrtopf between the external conductor of a coaxial feed line, and disconnecting the loop of a high frequency current.

CONSTITUTION: The Sperrtopf is formed by grounding the conductor to the ground conductor of a circuit board 4 in a cabinet 3 at a point 6 by setting impedance between the external conductor 5b of the coaxial feed line 5 in a direction of ground point 6 from a position 11 in the neighborhood of a feed point 2 and the conductor 10 at high impedance. Thereby, no high frequency current on the outside of the conductor 5b flows, and a current flows on a ground wire 7 of 1/4-wavelength efficiently. Also, the part of the cabinet 3 located in the neighborhood of the ground wire 7 and a Sperrtopf forming part and covering them is constituted of at least an insulating material.

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CLAIMS

[Claim(s)]
[Claim 1] The n/4-wave antenna which has the feeding point in the central conductor of a coaxial feeder (n is odd number), The ground wire which has n/4 wave (n is odd number) of die length connected to the outer conductor of said coaxial feeder possesses. It is the walkie-talkie with which a dipole antenna consists of said n/4-wave antennas and ground wire. Said coaxial feeder in the location from which n/4 wave (n is odd number) was separated from said feeding point an outer conductor It connects with the end of the conductor which has n/4 wave (n is odd number) of die length while being grounded by the conductor. the ground of the circuit board -- The walkie-talkie characterized by for said coaxial feeder and the conductor which has n/4 wave of die length chipping near the feeding point from said touch-down, being arranged in parallel, forming the SHUPERU top, and the wrap walkie-talkie housing section being constituted from an insulating material by said ground-wire list in the SHUPERU top formation section.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the cellular phone used for mobile communication, a portable radio transmitter, a receiver, etc.
[0002]
[Description of the Prior Art] When the housing of a walkie-talkie is touched, JP,4-

179302,A is proposed for the purpose of preventing property degradation by leakage of antenna current. This technique inhibits that antenna current flows to a housing by forming the SHUPERU top between the antenna 1 to which electric power is supplied from central conductor 5a of a coaxial feeder 5 like drawing 3 , the housing 12 covered with the ground wire 7 of an antenna 1 with the conductor in the walkie-talkie which constitutes a dipole antenna, and the conductor 13 which covers that top face, seeing from an antenna 1 side, and making it a high impedance.
[0003]
[Problem(s) to be Solved by the Invention] however, the above-mentioned conventional technique -- like -- a housing 12 -- a conductor -- covering -- in addition -- and the top face of a housing 12 is enlarged against thin-shape-izing of the latest housing with the conductor 13 for forming the SHUPERU top wrap structure not only requires cost, but, and there is a problem on mounting. Especially in the thing which transmits feeble power like a cordless telephone, since feeble power does not affect an internal circuitry etc., it will become enlargement of a device for there to be no wrap need and to constitute a housing like the above-mentioned conventional technique with a conductor, at a cost rise list.
[0004] In order to solve the technical problem of the above-mentioned conventional technique, by the SHUPERU top, this invention is a walkie-talkie which obtains good sensibility to a talk state, it is used for the walkie-talkie which transmits especially feeble power, such as a cordless telephone, and a miniaturization aims [this invention] at offer of an easy walkie-talkie by suitable low cost.
[0005]
[Means for Solving the Problem] In order to solve the technical problem of the above-mentioned conventional technique, this invention is the walkie-talkie which changes into unbalance the dipole antenna which is a balanced antenna by the SHUPERU top who arranged the conductor and was formed so that the SHUPERU top may be formed between the outer conductors of the coaxial feeder inside a walkie-talkie housing, and cut off the loop formation of the high frequency current.
[0006] The n/4-wave antenna which specifically has the feeding point in the central conductor of a coaxial feeder (n is odd number), The ground wire which has n/4 wave (n is odd number) of die length connected to the outer conductor of said coaxial feeder possesses. It is the walkie-talkie with which a dipole antenna consists of said n/4-wave antennas and ground wire. Said coaxial feeder in the location from which n/4 wave (n is odd number) was separated from said feeding point an outer conductor It connects with the end of the conductor which has n/4 wave (n is odd number) of die length while being grounded by the conductor. the ground of the circuit board -- It is the walkie-talkie with which said coaxial feeder and the conductor which has n/4 wave of die length chip near the feeding point from said touch-down, it is arranged in parallel, the SHUPERU top is formed, and the wrap walkie-talkie housing section is constituted from an insulating material by said ground-wire list in the SHUPERU top

formation section.
[0007]
[Example] Hereafter, one example of this invention is explained using a drawing. Drawing 1 is the sectional view of the walkie-talkie in which one example of this invention is shown, and a walkie-talkie consists of a quarter-wave antenna 1, a housing 3, the circuit board 4, a coaxial feeder 5, ground wire 7 of the die length of quarter-wave length, and a conductor 10 of the die length of quarter-wave length.
[0008] A quarter-wave antenna 1 is connected with central conductor 5a of a coaxial feeder 5 in the feeding point 2. Moreover, it is formed in the circuit board 4, it connects with outer-conductor 5b of a coaxial feeder 5 in the near location 11 of the feeding point 2, and the ground wire 7 of the die length of quarter-wave length constitutes a dipole antenna from an antenna 1 and ground wire 7. moreover, the grounding point 6 from which 1/4 wave was separated from the feeding point 2 -- outer-conductor 5b of a coaxial feeder 5 -- a touch-down sake -- the ground of the circuit board 4 -- while connecting with a conductor, it connects with the end of the conductor 10 which has the die length of quarter-wave length. This conductor 10 is arranged [to / from a grounding point 6 / near the feeding point 2] in parallel with a coaxial feeder 5, and forms the SHUPERU top between a conductor 10 and a coaxial feeder 5.
[0009] drawing 2 -- the principle-of-operation Fig. of drawing 1 -- it is -- the impedance between outer-conductor 5b of the coaxial feeder 5 of the near location 11 of the feeding point 2 to grounding point 6 direction, and a conductor 10 -- a conductor 10 -- the ground of the circuit board 4 of the housing 3 interior -- since it is grounded by the conductor in the grounding point 6, it becomes a high impedance and the SHUPERU top is formed. For this reason, the high frequency current of arrow-head 8 direction which flows the outside of outer-conductor 5b of a coaxial feeder 5 does not flow, but it flows efficiently to the ground wire 7 of the die length of quarter-wave length, and becomes current distribution 9. for this reason, the ground of the circuit board 4 -- the leakage current of an antenna does not flow to a conductor, but while preventing property degradation when touching the housing 3 of a walkie-talkie, the reduction of spurious radiation and the improvement in antenna efficiency by leakage of antenna current are attained, and the engine performance of a cellular phone, a portable radio transmitter, and a receiver can be improved.
[0010] Moreover, in order to improve property improvement of the SHUPERU top and current distribution 9, a conductor 10 and the ground wire 7 at least cannot be covered with a conductor. Therefore, it is in ground-wire 7 list near the SHUPERU top formation section, and the part of the wrap housing 3 needs to constitute these from an insulating material at least. Since transmitted power does not have a bad influence on the circuit inside a substrate even if it constitutes a housing 3 from an insulating material like especially a cordless telephone in the case of a walkie-talkie with very small transmitted power, in a talk state, good sensibility can be obtained by

the SHUPERU top. Therefore, since there is no wrap need further at a conductor, a miniaturization is easy and contributes a housing 3 to the fall of big cost.
[0011] in addition, explanation of the example of this invention -- setting -- an antenna 1 and ground wire 7 -- n/4 wave (n is odd number) -- even if -- naturally it comes out that it is applicable similarly, there is, and spacing of the feeding point 2 and a grounding point 6 and the die length of a conductor 10 are also made as for it to n/4 wave (n is odd number). Moreover, an antenna 1 and ground wire 7 can also be miniaturized by winding spirally.
[0012]
[Effect of the Invention] It uses and is suitable for the walkie-talkie with which especially this invention transmits feeble power, such as a cordless telephone, as an above-mentioned configuration, and since property degradation when touching the reduction and the walkie-talkie housing of spurious radiation by leakage of antenna current can be prevented by forming the SHUPERU top within a walkie-talkie housing, and cutting off the loop formation of the inphase component of the high frequency current, sensibility good to a talk state is obtained, and the miniaturization of a housing is easy and contributes to the fall of big cost.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the sectional view of the walkie-talkie in which one example of this invention is shown.
[Drawing 2] It is the principle-of-operation Fig. of drawing 1 .
[Drawing 3] It is the sectional view of the walkie-talkie in which the conventional technique is shown.
[Description of Notations]
1 Antenna
2 Feeding Point
3 Housing
4 Circuit Board
5 Coaxial Feeder
5a Central conductor
5b Outer conductor
6 Grounding Point
7 Ground Wire
8 Arrow Head

9 Current Distribution
10 Conductor of N/4 Wave (N is Odd Number) of Die Length

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審査請求　未請求　請求項の数１　ＯＬ　（全　４　頁）

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(71)出願人　000006633
京セラ株式会社
京都府京都市山科区東野北井ノ上町５番地の22

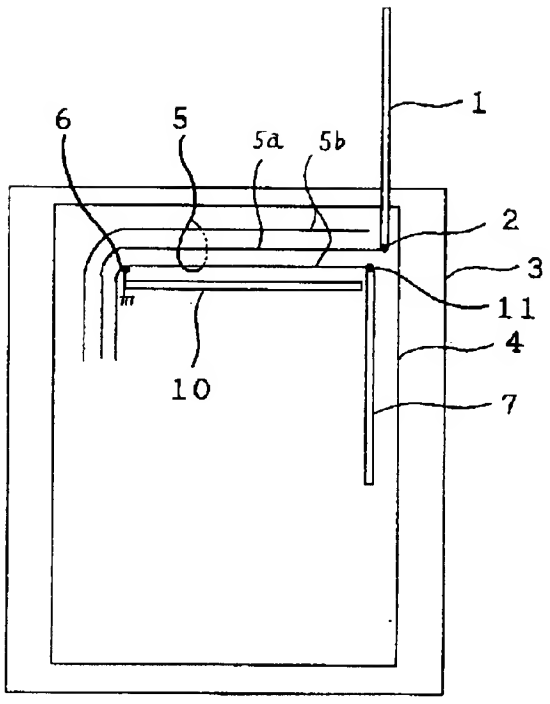
(72)発明者　森下　勝司
東京都世田谷区玉川台２丁目14番９号　京セラ株式会社東京用賀事業所内

(54)【発明の名称】　無線機

(57)【要約】

【目的】シュペルトップによって通話状態に良好な感度を得る無線機であって、特にコードレス電話等の微弱電力を送信する無線機に用いて好適な、低コストで小型化が容易な無線機の提供を目的とする。

【構成】本発明は、ダイポールアンテナを筐体３内部で同軸給電線５の外部導体５ｂと導体１０との間にシュペルトップを形成することにより不平衡に変換し、高周波電流のループを断ち切るように構成した無線機である。



【特許請求の範囲】
【請求項１】同軸給電線の中心導体に給電点を有するｎ／４波長アンテナ（ｎは奇数）と、前記同軸給電線の外部導体に接続されるｎ／４波長（ｎは奇数）の長さを有する地線とが具備され、前記ｎ／４波長アンテナと地線とでダイポールアンテナが構成される無線機であって、前記同軸給電線は前記給電点からｎ／４波長（ｎは奇数）離れた位置で外部導体が、回路基板の地導体に接地されるとともにｎ／４波長（ｎは奇数）の長さを有する導体の一端に接続され、前記同軸給電線とｎ／４波長の長さを有する導体とが前記接地から給電点近傍にかけて平行に配置されてシュペルトップが形成され、前記地線並びにシュペルトップ形成部を覆う無線機筐体部が絶縁物で構成されていることを特徴とする無線機。
【発明の詳細な説明】
【０００１】
【産業上の利用分野】本発明は移動通信に使用される携帯電話や携帯用無線送信機、受信機等に関するものである。
【０００２】
【従来の技術】無線機の筐体に触れたときにアンテナ電流の漏洩による特性劣化を防ぐことを目的として特開平４－１７９３０２号が提案されている。この技術は、図３のように同軸給電線５の中心導体５ａから給電されるアンテナ１と、アンテナ１の地線７によってダイポールアンテナを構成する無線機において、導体で覆われた筐体１２とその上面を覆う導体１３との間でシュペルトップを形成してアンテナ１側から見て高インピーダンスにすることでアンテナ電流が筐体に流れることを抑止するものである。
【０００３】
【発明が解決しようとする課題】しかしながら、上記従来技術のように筐体１２を導体で覆い、なおかつシュペルトップを形成するための導体１３で筐体１２の上面を覆う構造はコストがかかるばかりでなく、最近の筐体の薄型化に反して大型化してしまい、実装上の問題がある。特に、コードレス電話のように微弱電力を送信するものでは、微弱電力が内部回路等に影響を与えることがないために、筐体を導体で覆う必要はなく、上記従来技術のように構成することはコストアップ並びに機器の大型化になってしまう。
【０００４】本発明は上記従来技術の課題を解決するために、シュペルトップによって通話状態に良好な感度を得る無線機であって、特にコードレス電話等の微弱電力を送信する無線機に用いて好適な、低コストで小型化が容易な無線機の提供を目的とする。
【０００５】
【課題を解決するための手段】上記従来技術の課題を解決するために本発明は、平衡アンテナであるダイポールアンテナを無線機筐体内部でその同軸給電線の外部導体との間でシュペルトップを形成するように導体を配設して、形成されたシュペルトップによって不平衡に変換して高周波電流のループを断ち切るようにした無線機である。
【０００６】具体的には、同軸給電線の中心導体に給電点を有するｎ／４波長アンテナ（ｎは奇数）と、前記同軸給電線の外部導体に接続されるｎ／４波長（ｎは奇数）の長さを有する地線とが具備され、前記ｎ／４波長アンテナと地線とでダイポールアンテナが構成される無線機であって、前記同軸給電線は前記給電点からｎ／４波長（ｎは奇数）離れた位置で外部導体が、回路基板の地導体に接地されるとともにｎ／４波長（ｎは奇数）の長さを有する導体の一端に接続され、前記同軸給電線とｎ／４波長の長さを有する導体とが前記接地から給電点近傍にかけて平行に配置されてシュペルトップが形成され、前記地線並びにシュペルトップ形成部を覆う無線機筐体部が絶縁物で構成されている無線機である。
【０００７】
【実施例】以下、図面を用いて本発明の一実施例を説明する。図１は、本発明の一実施例を示す無線機の断面図であり、１／４波長アンテナ１、筐体３、回路基板４、同軸給電線５、１／４波長の長さの地線７、１／４波長の長さの導体１０から無線機は構成される。
【０００８】１／４波長アンテナ１は同軸給電線５の中心導体５ａと給電点２で接続される。また、１／４波長の長さの地線７は回路基板４に形成されており、給電点２の近傍位置１１で同軸給電線５の外部導体５ｂに接続されて、アンテナ１と地線７とでダイポールアンテナを構成する。また、給電点２から１／４波長離れた接地点６で同軸給電線５の外部導体５ｂが、接地のために回路基板４の地導体に接続されるとともに１／４波長の長さを有する導体１０の一端に接続されている。この導体１０は接地点６から給電点２の近傍まで同軸給電線５に平行に配設されて、導体１０と同軸給電線５との間でシュペルトップを形成する。
【０００９】図２は図１の動作原理図であり、給電点２の近傍位置１１から接地点６方向の同軸給電線５の外部導体５ｂと導体１０との間のインピーダンスは、導体１０が筐体３内部の回路基板４の地導体に接地点６で接地されているため高いインピーダンスとなりシュペルトップが形成される。このため、同軸給電線５の外部導体５ｂの外側を流れる矢印８方向の高周波電流が流れず１／４波長の長さの地線７に効率良く流れ、電流分布９になる。このため回路基板４の地導体にはアンテナの漏洩電流が流れず、無線機の筐体３に触れたときの特性劣化を防ぐとともに、アンテナ電流の漏洩による不要輻射の低減やアンテナ効率の向上が可能となり携帯電話や携帯用無線送信機、受信機の性能が改善できる。
【００１０】また、シュペルトップの特性改善及び電流分布９を良くするために、少なくとも導体１０及び地線

７は導体で覆うことはできない。そのため、地線７並びにシュペルトップ形成部の近傍にあってこれらを覆う筐体３の部位は少なくとも絶縁物にて構成する必要がある。特にコードレス電話等のように送信電力が極めて小さい無線機の場合には筐体３を絶縁物で構成しても、送信電力が基板内部の回路に悪影響を与えないので、シュペルトップによって通話状態において良好な感度を得られる。したがって、筐体３をさらに導体で覆う必要がないので、小型化が容易で、大きなコストの低下に寄与する。

【００１１】なお、本発明の実施例の説明においてはアンテナ１や地線７はｎ／４波長（ｎは奇数）にしても同様に適用できることは当然であり、給電点２と接地点６との間隔及び導体１０の長さもｎ／４波長（ｎは奇数）にできる。また、アンテナ１や地線７は螺旋状に巻くことにより小型化することも可能である。

【００１２】

【発明の効果】上述の構成の通り本発明は、特にコードレス電話等の微弱電力を送信する無線機に用いて好適で、無線機筐体内でシュペルトップを形成して高周波電流の同相成分のループを断ち切ることで、アンテナ電流の漏洩による不要輻射の低減や無線機筐体に触れたときの特性劣化を防ぐことができるので、通話状態に良好な感度が得られ、かつ筐体の小型化が容易で、大きなコストの低下に寄与するものである。

【図面の簡単な説明】

【図１】本発明の一実施例を示す無線機の断面図である。

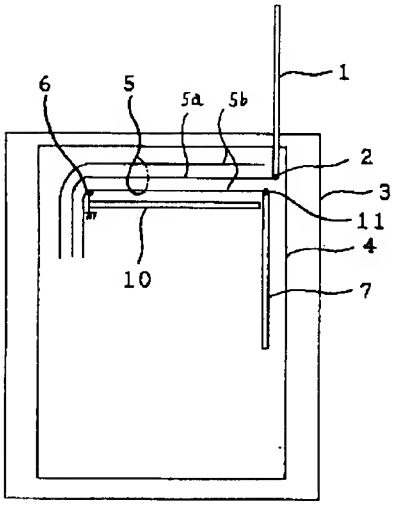
【図２】図１の動作原理図である。

【図３】従来技術を示す無線機の断面図である。

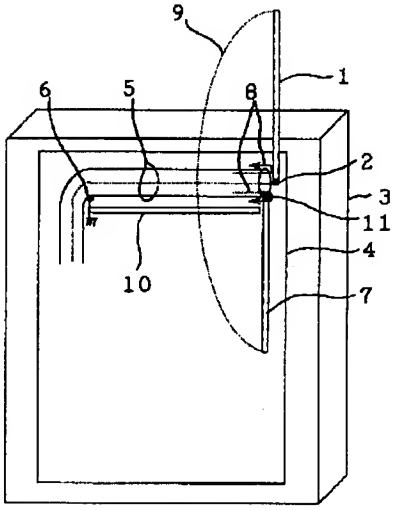
【符号の説明】

１　アンテナ
２　給電点
３　筐体
４　回路基板
５　同軸給電線
５ａ　中心導体
５ｂ　外部導体
６　接地点
７　地線
８　矢印
９　電流分布
１０　ｎ／４波長（ｎは奇数）の長さの導体

【図１】



【図２】



【図３】